CLAIMS

1. A method of localising damages or defects in objects or materials, wherein a standing sound wave is generated within the object or the material in order to detect damages or defects within an area of the object or the material by virtue of a reading obtained when measuring on the standing wave, **characterized** by limiting the standing wave substantially to a small area in the object or in the material, between a vibration surface and another surface in the object or the material, and by using said standing wave for detecting damages in the object or in the material by the use of Slow Dynamics.

2. A method according to claim 1, **characterized** by sending into the object or into the material two signals of slightly different high frequencies, such as to generate a frequency difference of low frequency value as a result of the non-linearity of the object or of the material, which low frequency signal creates sidebands to a signal of a third frequency, preferably the frequency of the standing wave, said third frequency signal being delivered to the object or to the material for the purpose of detecting damages or a defect in said object or in said material from the occurrence of said sideband.

3. A method according to claim 1 in which there is tested a unit which comprises said object or said material and a damage-free or faultless medium, **characterized** by exciting several different oscillation modes in said unit, and weighting non-linear responses such as to form a damage position indicating curve that indicates the position of the damage or defect.

4. An arrangement for localising damages or defects in objects or in materials, wherein the arrangement includes a signal source which is connected to a transmitter for generating a resonant sound wave within the object or the material, and a receiver for receiving a measurement signal from the object or the material connected to a measurement signal processing and analysing apparatus, **characterized** in that the transmitter is adapted to generate the sound wave substantially in a small area in the object or the material, and in that the measurement signal processing and analysing apparatus is adapted to detect

damage or defects in the object or in the material by the use of Slow Dynamics.

5. An arrangement according to claim 4, **characterized** in that the transmitter is adapted with respect to said object or said material for the contactless transfer of sound energy to the object or the material, so as to create an open resonator between transmitter and object or transmitter and material.

6. An arrangement according to claim 4 or 5, **characterized** in that the transmitter includes a planar transmitter element.

7. An arrangement according to any one of claims 4-6, **characterized** in that the transmitter includes a concave transmitter element.

8. An arrangement according to any one of claims 4-7, **characterized** in that the transmitter includes a plurality of transmitter elements.

9. An arrangement according to claim 8, **characterized** in that the transmitter containing said plurality of transmitter elements is phase controlled for steering the direction of the signal beam.

10. An arrangement according to any one of claims 4-9, **characterized** in that the transmitter includes a transmitter element which consists of part of the object or the material.

11. An arrangement according to any one of claims 4-10, **characterized** in that the transmitter element includes additional material of pre-determined thickness so as to fulfil the conditions for resonance in that area or region of the object or the material where damage in the object or the material is intended to be localised.

12. An arrangement according to claim 11, **characterized** in that the transmitter element includes a material that has generally the same acoustic impedance as the object or the material, and in that said transmitter element is intended to be brought into contact with the object or the material in which damage

shall be localised.

13. An arrangement according to any one of claims 4-12, **characterized** in that the receiver includes a plurality of receiver elements.

14. An arrangement according to any one of claims 4-13, **characterized** in that the receiver includes at least one piezoelectric sensor.

15. An arrangement according to any one of claims 4-14, **characterized** in that transmitter and receiver are disposed in one and the same unit.

16. An arrangement according to any one of claims 4-15, **characterized** in that said measurement signal processing and analysing apparatus includes an oscilloscope.

17. An arrangement according to any one of claims 4-14, **characterized** in that said signal source and said measurement signal processing and analysing apparatus are realised with the aid of a computer.

18. An arrangement according to any one of claims 4-17, **characterized** in that the transmitter and the receiver can be moved over, or across, the object or the material and in that the signal source includes an automatic frequency control facility which functions to change the frequency such as to retain resonance as the transmitter and receiver are moved.

19. An arrangement according to any one of claims 4-18, **characterized** in that the radius of the transmitter and the frequency of the signal source are adapted to give the signal from the transmitter a small beam angle.

20. An arrangement according to any one of claims 4-13 or any one of claims 16-19, **characterized** in that the receiver includes at least one laser sensor for contactless reception of the measurement signal from the object or the material.

21. An arrangement according to any one of claims 4-13 or any one of claims

16-19, **characterized** in that the receiver includes at least one microphone for contactless reception of the measurement signal from the object or the material.

22. An arrangement according to any one of claims 4-21, **characterized** in that the transmitter includes a parametric transmitter having disappearing sound.